

INTRODUCTION:

The Houlton Band of Maliseet Indians (HBMI) is a federally recognized Tribe located in Aroostook County, Maine with over 800 acres of reservation/trust land along the Meduxnekeag River (*Attachment 1*). We Maliseets are river people who traditionally fish, trap, hunt and gather in the waters, floodplains, and riparian zone of the St. John Watershed. The Meduxnekeag, a tributary of the St. John, is a critical link in preserving our tribal practices, traditions and history. The Meduxnekeag is also the most intensively farmed watershed in southern Aroostook County. After purchasing our lands in 1988, we saw obvious problems with water quality in our stretch of river in the form of high sediment loads from runoff and extensive algae growth in low water summer months.

To address these water quality problems, HBMI, in 1991, partnered with the Southern Aroostook Soil and Water Conservation District (SASWCD) on a P.L. 566 project that produced the *Watershed Protection Plan – Environmental Assessment – 1993* (WPP). In 1992, the Band established a monitoring program to assess improvements in water quality resulting from implementation of this Plan. Unfortunately, most P.L. 566 funding associated with implementation of the WPP never materialized. Thus HBMI along with SASWCD is using various other funding sources [e.g., EPA Pollution Prevention (P2) Grants, USDA's EQIP program, MDEP CWA 319 funds] to implement the WPP.

In 1995, SASWCD with support from MDEP helped establish the Meduxnekeag Watershed Coalition (MWC); an organization that provides a community forum for watershed management and water quality issues. Many members have and continue to develop joint water quality projects as a result of discussions and relationships developed at MWC meetings. HBMI is a founding member and strong supporter of the Coalition.

Most recently, in 2002, some members of MWC, interested in a more active approach to watershed management incorporated the Organization for Watershed Living (OWL) as a nonprofit organization. OWL maintains a relationship with MWC and benefits from the Coalition's role as a community education and outreach organization.

Although many organizations and individuals are working to improve water quality in the Meduxnekeag, two well-documented problems have yet to be addressed.

(1) Soil erosion off potato fields remains a significant problem. To date there is no culturally accepted system for minimizing the amount of exposed ground on these fields during the winter in this northern climate. However, farmers in Prince Edward Island (PEI), Canada, have developed methods for a similar climate including planting spring varieties of small grains as winter cover for earlier harvested varieties of potatoes and mulching areas where later harvested varieties are grown. The grant will facilitate introduction and wide spread use of these Best Management Practices (BMP) to the area.

(2) HBMI's water quality monitoring program identified illicit sewer connections to a storm water system draining an eastern area of Houlton. The Watershed Initiative grant will also fund removal of wastewater pollution entering the river via the storm drain.

CHARACTERIZATION OF THE MEDUXNEKEAG WATERSHED:

Description of the Watershed.

Geography - The Main Branch Meduxnekeag Watershed is located in southeastern Aroostook County, Maine (*Attachment 2*). Its drainage area to the New Brunswick, Canada border is approximately 289 sq. miles. Land use is as follows: 146,200 acres are forested, 23,900 acres are active cropland (potatoes & grain), 3,900 acres are in hay and pasture, and 3,000 acres are grassland. Nearly 8,000 acres are either urban land or water.

Climate - The growing season is short, between 100 and 125 days. An average annual precipitation of 37 inches includes the water equivalent of 95 inches of snow.

Precipitation is rather evenly distributed throughout the year, but a large part of the total annual runoff is from spring snowmelt.

Soils & Geology - The predominant cropland soils in the watershed have soil erosion rates that exceed “tolerable soil loss” from 82% to 99% on active cropland fields. Relief is moderate with hills and ridges rising 200 to 500 feet above the valley floors.

Agriculture - Some 393 farms of all sizes, with 2,443 separate fields, occupy 30,800 acres of agricultural land. About 20,000 acres of potatoes, most commonly in rotation with grain, are grown on 212 farms. Fifty-two livestock operations support 2,350 animal units, mostly dairy or beef cattle. Most of the agricultural land is concentrated in the lower half of the watershed in the Houlton area.

Hydrology - The watershed has 67 miles of river and 290 miles of streams. Many small lakes are located in the upstream parts of the watershed, above the agricultural land.

Problems in the Watershed

Presently there are reaches of the Meduxnekeag that fail to meet their classification. According to a TMDL study completed by MDEP in September 2000 one of the major factors in non-attainment is nutrient enrichment. In addition, the 1993 Watershed Protection Plan (WPP) points to significant soil erosion problems from agricultural crop lands and livestock agriculture. During runoff events, tributary streams and the Main Branch turn muddy from eroded soil particles (*Attachment 3*). Runoff from snowmelt, spring and fall rains, occurs when croplands are bare, delivering a heavy sediment load to

the streams. Heavy summer rains, even with some ground cover, add sediment loads to streams. In addition, soil particles carry hitchhikers like nutrients to the river.

The result is each year the gravelly, cobbly substrate of most streams and the Main Branch becomes coated and clogged with algae, silt, and macrophytes (*Attachment 4*). Specific in-stream problems include elevated water temperatures, lower oxygen levels, loss of fishery habitat, loss of fish spawning and nursery areas, and changes in aquatic life and the food chain (TMDL & HBMI water monitoring program unpublished data.)

In addition to NPS issues related to agriculture, most recently, during the summer of 2002, HBMI water quality monitoring personnel identified high levels of *E. coli* bacteria and sewage odors in storm water outfall draining an eastern area of the Town of Houlton (*Attachment 5*). After reporting these results to MDEP, the local wastewater treatment plant and the Town of Houlton, these entities concluded the problem is most likely a result of illicit connections to the stormwater system.

OVERALL WATERSHED PLANNING EFFORT:

The WPP assessed non-point sources of pollution in the watershed directly related to the forestry and agriculture. This Plan also provides a description of BMPs that should be used to address NPS pollution, mainly nutrients and soil. The WPP describes its

Long Term Goals: as Water Quality Improvement and Watershed Protection, and

Short Term Goals: as addressing the following: 1) cropland soil erosion, 2) Lack of adequate riparian buffer zones between cropland and drainage ways, 3) Inefficient use of pastures, animal wastes, and pesticides; 4) Inefficient forest management, and 5) Erosion and sedimentation associated with farm roads and ditches.

Existing Watershed Protection Efforts

Stakeholder/Partner	Funding	Activity
HBMI	EQIP, P2, CWA 319, P.L. 566	3 waterways, 7 sediment basins, 1 nutrient/ sediment control structure, 1 plunge pool, 23.7 acres CRP, 7 acres riparian buffer, & several non-agricultural BMPs - <i>strives to be a model landowner in the region.</i>
HBMI/SASWCD	P2	1 cattle exclusion, pasture pumps, rotational grazing
SASWCD/ MDEP	CWA 319	Riparian buffers; 6 nutrient & sediment control structures; critical area treatment; 3 road ditch stabilization, road reshaping & grading projects; 4 integrated crop management, 20 nutrient management, 4 dairy waste management and 10 whole farm plans; 3 heavy use areas; 2 manure storage facilities; 2 urban BMPs
SASWCD	P.L. 566	300 acres of riparian buffers, some riverbank stabilization
Meduxnekeag Lake Assoc.	CWA 319	spring 2003: road stabilization and driveway BMPs and riparian buffers in the direct lake watershed.
NRCS		NPS BMP technical assistance, education & outreach provided to agricultural community
HBMI, SASWCD, Houlton Adult Ed	P.L. 566, P2	NPS educational programs to forest industry ¹

Prioritization of Projects & Projects included in the WPP.

The WPP strongly states its priority of reducing soil erosion. The Plan goes on to list specific BMPs such as waterways, sediment basins, and erosion control measures.

Responsible Parties for the WPP

WPP Sponsors, *HBMI and SASWCD* obtain agreements with landowners or operators to operate and maintain land treatment practices to protect and improve the watershed.

NRCS assists the Sponsors in providing technical assistance to land owners or operators to plan and install land treatment practices.

DESCRIPTION OF PROPOSED PROJECTS

Project fit with plan and goals.

¹ *Forestry, although a major land use in the Watershed, plays only a minimal role in water pollution.*

The proposed projects to reduce soil erosion via Minimizing Open Ground (MOG) and eliminate illicit discharges in the stormwater system, will both reduce nutrients and soil from entering the river which fit well within the goals and objectives of the WPP.

Proposed Projects

PROJECT 1 - Preventing Cropland Erosion

This project addresses cropland erosion through a MOG concept utilizing a combination of spring varieties of small grain winter cover crops on potato fields harvested earlier in the season (August/ September) and mulching fields harvested later in the season (late September/October). These conservation practices (*listed as practice codes 340 and 484 respectively in NRCS' Field Office Technical Guide*) improve soil quality and reduce the physical impact of storm events - both of which result in reduced soil erosion and improved water quality. Improving soil quality also provides short and long-term improvement in crop yields thus offering farmers a market-based incentive for implementing these practices. Neither practice is currently used by farmers in the Meduxnekeag Watershed nor anywhere else in Maine, although potato farmers in Prince Edward Island, Canada successfully apply these practices.

SASWCD and Cooperative Extension representatives have recruited 6 area farmers who farm approximately 2000 acres in the Main Branch Meduxnekeag to gradually apply spring varieties of small grain winter cover and mulching practices on their fields over a three-year period. These farmers farm relatively large acreages in the area of most concern – active potato fields close to the Main Branch - and are leaders in the farming community. Their adoption of winter cover and mulching itself will help spread these practices to smaller farmers located further up in the watershed. These practices reduce

soil erosion by 40% resulting in a significant drop in tons of soil lost off farm fields and delivered to the river. Over the long term by promoting these practices to farmers throughout the watershed up to 60,000 tons of soil and 99,000 lbs of phosphorus annually can be retained on potato fields.

Project 1 - Schedule

Date	Task	Responsible Party
May 2003	Sign agreement with EPA	EPA & HBMI
June 2003	Sign contract with SASWCD & other partners.	HBMI
June 2003	Obtain signed cooperators agreements with local landowners.	SASWCD
June-Nov. 2003, 04, 05	Technical assistance provided to participating farmers.	NRCS & UM Coop. Extension.
July 2003, 04, 05	Modifications made to existing farm harvest equipment.	Farmers with TA from Coop. Extension.
July 2003, 04, 05	Mulching equipment leased.	SASWCD
August-Oct. 2003, 04, 05	conservation practice applied to 2000 ac. In '03, 5000 ac. in '04 & 10,000 ac. in '05	Farmers. Tracked by SASWCD
December 2003, 04, 05	BMP installation/implementation cost sharing	SASWCD
On going	Education and Outreach.	UM Coop. Extension.
On going	Reporting, record keeping, and general project management.	HBMI
December 2003, 04, 05	Load reduction calculations.	NRCS

Environmental Milestones:

Actions accomplished: 10,000 acres treated and participation by 33 producers.

Pollutants controlled: sediment and phosphorus reduction goals 30,000 tons and 49,500 pounds per year respectively

PROJECT 2 - Preventing Storm Water Contamination from illicit sewer connections.

This project will address high levels of bacteria and the associated implied nutrients from the illicit storm drain connections. A camera survey of the storm drain will be undertaken to locate these connections and all improper connections removed. HBMI

will continue to monitor water quality from this storm drain under an EPA-approved Quality Assurance Project Plan (QAPP) and in coordination with Houlton’s remediation activities evaluate their success.

Project 2 – Schedule

Date	Task	Responsible Party
May 2003	Sign agreement with EPA	EPA & HBMI
June 2003	Sign agreement with the Town of Houlton.	HBMI & Houlton
May-Sept. 2003 May-Sept. 2004	Monitoring storm drain discharge for <i>E. coli</i>	HBMI
August 2003	Camera survey completed.	Town of Houlton
June 2004	Illicit discharges removed.	Town of Houlton
On going	Reporting, record keeping, & general project management.	HBMI

Environmental Milestones:

Actions accomplished: all illicit sewer connections removed.

Pollutants controlled: *E. coli* bacteria (colonies/L) reductions will be measured.

Monitoring and Evaluation

For Project 1, Minimizing Open Ground, we will determine pollutant load reduction estimates using “Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual, Rev., June 1999, Mich. Dept. of Env. Quality” method.

Environmental improvements from Project 2, removing illicit sewer connections, can be directly measured. HBMI Water Resources staff will continue to monitor *E. coli* in the storm drain outfall using methods approved in our existing QAPP.

Project complements EPA, federal and state programs or mandates

Recently Maine enacted legislation that requires nutrient management plans for livestock operations. Maine Dept. of Agriculture received Bond money to assist livestock farmers in developing and implementing nutrient management plans through

the SWCDs. Project partners also encourage local landowners to participate in USDA's various programs through the Farm Bill to help plant riparian buffers, address livestock issues and implement other conventional and complementary conservation practices.

DESCRIPTION OF WATERSHED PROJECT MANAGEMENT & STAKEHOLDER INVOLVEMENT

Project Leader

Since 1991 HBMI has partnered and been involved in land use and water quality studies in the watershed. Our staff will administer the Watershed Initiative grant, enter into agreements with other cooperators to implement various components of the Project, and provide overall Project coordination and oversight. Since 1992, HBMI has successfully administered over 1.8 million dollars in 20 federal environmental grants. In addition, we have successfully completed two nonpoint source education projects through cooperative agreements with SASWCD and other watershed partners.

HBMI also has a well-established water resources program that has monitored pH, dissolved oxygen, temperature, turbidity, conductivity, total suspended solids, alkalinity, E. coli bacteria, benthic macroinvertebrates and periphytic algae in the Meduxnekeag under an approved EPA QAPP (*2002 River Water Monitoring & Quality Assurance Project Plan*) for 5 years; this last year at 23 sites. We regularly share data with MDEP.

Partners and Stakeholders

USDA Natural Resources Conservation Service (NRCS) staff will work with cooperating farmers to develop or modify Conservation Plans to incorporate MOG conservation practices and provide technical assistance.

Southern Aroostook Soil and Water Conservation District (SASWCD) personnel will enter into Cooperative Agreements with participating farmers to implement these conservation practices and monitor and evaluate their progress and success.

University of Maine Cooperative Extension (UMCE) staff will implement an MOG outreach and education program to area farmers.

Town of Houlton personnel will remediate the sewage contaminated storm drain located on the eastern side of the urban center of Houlton.

Maine Department of Environmental Protection (MDEP) personnel will circulate the results of this project to areas of the state outside of southern Aroostook County.

DESCRIPTION OF OUTREACH ACTIVITIES

Open ground in the fall, winter, and spring is the predominate state for soils used in potato production. The BMPs implemented in this project apply to other areas of Aroostook County (60,000 acres of potatoes) and other sections of Maine. To share these technology advances, field demonstration days and winter seminars will be held for local farmers who have not yet joined in MOG and then for other parts of the County and State. In addition, a comparison study between the MOG method and conventional unprotected soils will be maintained in a long-term rotation study already established by SASWCD and Extension at the “Bird Farm Natural Resource Education Center” in Houlton. This is critical since a production paradigm is a very difficult process to shift and the predominant system of open ground represents concerns by growers that they may be caught by late planting or harvest. The study will measure soil quality improvement and document nutrients sequestered by the small grain portion of the BMP and make comparative yield studies.

ATTACHMENT 6

BUDGET DETAIL

Personnel

Position/Title	Annual Salary	Percent time Assigned to Project	Total
Administrative Assistant	21,099.00	5%	1,055
Environmental Planner	42,461.00	5%	<u>2,123</u>
			3,178

<u>Fringe Benefits</u>	27.46% of Basic Salary (includes Health Benefits & Sick Leave)		873
------------------------	--	--	-----

<u>Travel</u>	50 miles @36.5 cents/mile		18
---------------	---------------------------	--	----

<u>Supplies</u>	Office supplies (paper, pens, file folders, etc.)		50
-----------------	---	--	----

Contractual Services

SASWCD		
- Salary & fringe (.05 FTE \$12/hr plus 24%)		15,850
- Administrative costs (15% of salary & fringe)		3,200
- Bale busters leases (4 @ \$5,340/year)		21,360
- Equipment modification cost share (11 @ \$1,230 each)		13,530
- Winter cover cost share (6,000 ac @ \$15/acre)		90,000
- Mulching cost share (4,000 ac @ \$50/acre)		<u>200,000</u>
		343,940
Cooperative Extension		
- Summer technician (salary & fringe)		4,000
- Soil tests, signage		1,000
- Winter school – travel for ag specialist & farmer from PEI to Houlton.		<u>1,000</u>
		6,000
Town of Houlton		
- Camera survey (1 st year only)		6,000
- Sewer connection cost share (2 nd year only)		<u>3,000</u>
		9,000

Subtotal: 358,940

Other

<i>costs not included in HBMI's negotiated IDC rate</i>	
- Telephone (\$15/month)	180
- Space Costs (\$20/month)	240
- Postage	20
- Printing & Reproduction	<u>50</u>
	490

Direct Charges	363,549
Indirect Charges ² (4,609 x .622)	2,867
COST SHARE	
Winter cover (6000 ac \$12/acre)	72,000
Mulching (4000 ac @ \$33/acre)	132,000
Equipment modification (11 @ \$1,230 each)	13,530
Cooperative Extension (salary & fringe)	6,000
Town of Houlton (1 ^t year only)	3,152
Houlton Water Company (2 nd year only)	1,064
Landowner (2 nd year only)	<u>2,500</u>
	230,246
FEDERAL SHARE	366,416
GRAND TOTAL	650,782

THREE YEAR BUDGET

	FY '03	FY'04	FY'05	Total
Salary	3,178	3,178	3,178	9,534
Fringe	873	873	873	2,619
Travel	18	18	18	54
Supplies	50	50	50	150
Contractual Services	355,940	352,940	349,940	1,058,820
Other	490	490	490	1,470
Direct Costs	360,549	357,549	354,549	1,072,647
Indirect Costs	2,867	2,867	2,867	8,601
Cost Share	226,682	227,094	223,530	677,306
<i>Federal Share</i>	<i>363,416</i>	<i>360,416</i>	<i>357,416</i>	<i>1,081,248</i>
Grand Total	590,098	587,510	580,946	1,758,554

² Indirect charges are made on all items in the budget except equipment and contractual services

ATTACHMENT 7

**LETTERS OF COMMITMENT
& SUPPORT**

ATTACHMENT 8

REFERENCES

Southern Aroostook Soil and Water Conservation District, Houlton Band of Maliseet Indians, United States Department of Agriculture. June 1993. Main Branch Meduxnekeag River Watershed, Aroostook County, Maine Watershed Protection Plan/Environmental Assessment

Holmstrom, D., DeHaan, R., Sanderson, J.B. and MacLeod, J.A. 1999. Residue management for potato rotation in Prince Edward Island. *J. Soil Water Conserv.* 54:445-448.

Edwards, L.M., Volk, A. and Burney, J.R. 2000. Mulching potatoes: aspects of mulch management systems and soil erosion. *Amer. J. Potato Res.* 77:225-232.

Edwards, L., Burney, J.R., Richter, G. and MacRae, A.H. 2000. Evaluation of compost and straw mulching on soil-loss characteristics in erosion plots of potatoes in Prince Edward Island, Canada. *Agric. Ecosyst. Environ.* 81:217-222.

